

Definition of U and physical arrangement need clarification

192-49

WTC - EXTERIOR WALL INSULATION

SPANDRELS AND EXTERIOR COLUMNS

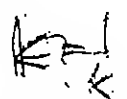
THERMAL CONDUCTIVITY AND HEAT TRANSMISSION  
(In Order of Max. Thermal Reduction)

VALUES BASED ON WALL & COLUMN DESIGN

As of May 5, 1966

DRAWING A-P-303

small heat transmission coefficient?

MATERIAL	 (Resistivity) "K"	(Conductance) "C"	"U" Thermal Reduction Value				
			At Sides of Column		At Outside Face of Column (w/Air Space)		
			With 1-5/8" F.P.	With 3/8" Polyurethane Included	With 1-5/8" F.P.	With 3/8" Polyurethane Incl.	With 2" F.P. and 3/8" Polyurethane
Sprayed Mineral Fibre (Spraycraft or Cafco)	0.04	0.24	0.23	0.20	0.19	0.16	0.14
Sprayed (Cementitious) Vermiculite (Monokote)	0.06	0.36	0.34	0.26	0.24	0.20	0.18
Laminated Gypsum Board (U. S. G. Fire Code)	0.15	0.90	0.79	0.39	0.46	0.27	0.25
Concrete (L.W. 100 PCF)	0.30	1.80	1.37	0.41	0.53	0.30	0.29
Gypsum Plaster	0.50	3.00	2.05	0.51	0.60	0.32	0.31

Source of these values and their clear definition are important.



WTCI-437-P

$\frac{12}{12} = 1$   
 Inside surface coeff = 6.8  
 Outside surface coeff = 17  
 Air space = .97

WTC - EXTERIOR WALL INSULATIONS

SPANDRELS AND EXTERIOR COLUMNS

THERMAL CONDUCTIVITY AND HEAT TRANSMISSION COEFFICIENTS  
 (In Order of Max. Thermal Reduction)

VALUES BASED ON WALL & COLUMN DESIGN

As of May 5, 1966

314

MATERIAL	CONDUCTIVITY (K) BTU HR-SF-°F-IN	RESISTANCE (R) HR-SF-°F-IN BTU (Conductance) "K"	"U" COEFF. TRANSMISSION - BTU/HR-SF-°F Thermal Reduction Value				
			At Sides of Column		At Outside Face of Column (w/Air Space)		
			With 1-5/8" F.P.	With 3/8" Polyurethane Incl.	With 1-5/8" F.P.	With 3/8" Polyurethane Incl.	With 2" F.P. and 3/8" Polyurethane
1. Sprayed Mineral Fibre (Spraycraft) or Gafco	<del>0.04</del> .26	<del>0.24</del> 3.85	<del>0.29</del> .141	<del>0.20</del> .107	<del>0.19</del> .124	<del>0.16</del> .097	<del>0.14</del> .086
2. Sprayed (Cementitious) Vermiculite (Monokote)	<del>0.05</del> .75	<del>0.20</del> 1.33	<del>0.25</del> .332	<del>0.20</del> .192	<del>0.24</del> .125	<del>0.20</del> .162	<del>0.18</del> .138
3. Laminated Gypsum Board (U. S. G. Fire Code)	<del>0.15</del> 1.11	<del>0.60</del> .9	<del>0.29</del> .133	<del>0.39</del> .222	<del>0.46</del> .305	<del>0.27</del> .183	<del>0.25</del> .172
4. Concrete (L.W. 100 PCF)	<del>0.30</del> 3.57	<del>0.33</del> .28	<del>0.37</del> .767	<del>0.41</del> .285	<del>0.53</del> .44	<del>0.30</del> .224	<del>0.29</del> .218
5. Gypsum Plaster	<del>0.50</del> 1.56	<del>0.20</del> 1.64	<del>0.05</del> .195	<del>0.53</del> .137	<del>0.60</del> .164	<del>0.32</del> .112	<del>0.31</del> .108
6. Polyurethane	.17	5.82	.146	.11	.128	.097	.088

Plaster Inside U = .312

WORLD TRADE CENTER

18 FT. 7  
3/8" URETHANE  
NO AIR SPACE

SKETCH NO. WTC-112  
JUNE 20, 1966

WITH 1 5/8" F.P.  
& AIR SPACE

5 P.B.  
4-7-73  
ESTB

EXTERIOR WALL, SPANDRELS AND EXTERIOR COLUMN INSULATIONS

THERMAL CONDUCTIVITY AND HEAT TRANSMISSION COEFFICIENTS

Value Based on Wall & Column Design As of 5/5/66

Drawing A-A-314

1 5/8" F.P. +  
3/8" URETHANE

Fireproofing Material	Conductivity (k) BTU HR-SF-1IN	"U" - Coefficient Transmission - BTU/HR-SF				
		At Sides of Column		At Outside Face of Column (w. Air Space)		
		With 1 5/8" F.P.	With 3/8" Polyurethane Included	With 1 5/8" F.P.	F.P. With 3/8" Polyurethane Included	With 2" F.P. and 3/8" Polyurethane
1. Sprayed Mineral Fiber (Spraycraft)	.26	<del>0.135</del> 0.135	<del>0.116</del> 0.116	.136	.104	.092
2. Sprayed (Cementitious) Vermiculite (Monokote)	.75	<del>0.302</del> 0.302	.221	.302	.182	<del>0.167</del> 0.167
3. Laminated Gypsum Board (U. S. G. Fire Code)	1.11	<del>0.385</del> 0.385	.267	.385	.209	.195
4. Concrete (L.W. 100 PCF)	3.57	<del>0.630</del> 0.630	.353	.625	.264	.256
5. Veneer	.38	<del>0.185</del> 0.185	.151	.185	.131	<del>0.116</del> 0.116
6. Celco	.27	<del>0.140</del> 0.140	.119	.140	<del>0.107</del> 0.107	<del>0.093</del> 0.093

Notes:

1. Fireproofing for inside face of column is assumed to be 1 3/8" gypsum plaster having conductivity of 1.56 and the overall transmission coeff. of .395 between the room and column steel.
2. Inside still air film resistance is taken as .68
3. Outside air film resistance is taken as .17
4. Air space resistance is taken as .97
5. Conductivity of polyurethane is taken as .17

WC:rt,dd

PRELIMINARY  
STUDY

6. MR. H. S. GILLOPP

11. M.W. PROD. Co.

STANDARD. N.J. 07874

12. D.L. 7-4390

N.J. 201-347-1200

13. H. R. LUDY 10TH

SMITH A. H. LUDY Co.

1414 EAST LINDEN AVE  
LINDEN, N.J.

WORLD TRADE CENTER

N.Y.C. 212-604-8265

EXTERIOR WALL, SPANDRELS AND EXTERIOR COLUMN INSULATIONS

N.J. 201-925-2100

THERMAL CONDUCTIVITY AND HEAT TRANSMISSION COEFFICIENTS

Value Based on Wall & Column Design As of 5/5/66

Drawing A-A-314

Fireproofing Material	Conductivity (k) BTU HR-SF-8F-IN	"U" - Coefficient Transmission - BTU/HR-SF-OF				
		At Sides of Column		At Outside Face of Column (W/Air Space)		
		With 1 5/8" F. P. & Air Space	1 5/8" F. P. + 3/8" Urethane No Air Space	With 1 5/8" F. P.	1 5/8" F. P. + 3/8" Urethane	With 2" F.P. and 3/8" Polyurethane
1. Sprayed Mineral Fiber (Spraycraft)	.26	0.135	0.116	.136	.104	.092
2. Sprayed (Cementi- tious) Vermiculite (Mono- kote)	.75	0.302	.221	.302	.182	0.167
3. Laminated Gypsum Board (U.S.G. FireCode)	1.11	0.385	.261	.385	.209	.195
4. Concrete (L.W. 100 PCF)	3.57	0.630	.353	.625	.264	.256
5. Vonco	.38	0.185	.151	.185	.131	0.116
6. Cafco	.27	0.140	.119	.140	0.107	0.093

Notes:

1. Fireproofing for inside face of column is assumed to be 1 3/8" gypsum plaster having conductivity of 1.56 and the overall transmission coeff. of .396 between the room and column steel.
2. Inside still air film resistance is taken as .68
3. Outside air film resistance is taken as .17
4. Air space resistance is taken as .97
5. Conductivity of polyurethane is taken as .17

NC:rt,dd,fk

DX 1222